



Terrafirma: a ground motion information service for Europe based on space-borne InSAR

R. Capes (1), N. Casagli (2), **P. Farina** (2), A. Ferretti (3), U. Wegmuller (4)

(1) NPA Group (Email: ren@npagroup.com), (2) Earth Sciences Dept., University of Firenze (Email: paolo.farina@unifi.it), (3) TeleRilevamento Europa (TRE) (Email:alessandro.ferretti@treuropa.com), (4) Gamma Remote Sensing (Email: wegmuller@gamma-rs.ch)

Terrafirma is one of ten Service Element projects being run by the European Space Agency under the Global Monitoring for Environment and Security initiative. The project is providing a Pan-European ground motion information service in each of the 25 member states of the EU to detect and monitor ground movements in relation to building stability, subsidence and ground heave, landslides, seismic activity and engineered excavations. The technology at the base of such a large-scale undertaking uses the data collected by European radar satellites, namely ERS1, ERS2 and Envisat processed through SAR interferometry (InSAR). By using state-of-the-art InSAR processing techniques, such as the Persistent Scatterers approach, thanks to the available archive of repeat satellite data, measurements of ground displacements with a millimetre scale accuracy can uniquely be provided back in time for the last 15 years.

The project is aimed at informing specialists, planners and the community at large about the new approach to the assessments of risks from ground movements across Europe and beyond. Terrafirma intends to achieve it through practical examples of how ESA's satellite can create ground motion measurements that, when coupled with expert knowledge and ground-based geoscience and engineering information, provide insights into these problems at a detail level, sometimes technically not reachable through the use of conventional techniques. The services provided by Terrafirma are to be delivered to end-users, represented mainly by public or private organizations dealing with ground movements connected both to natural hazards and human activities, primarily by National Geological Surveys who, integrating pre-existing and possibly in situ data with InSAR results can offer them enhanced products providing

causal and modelled information services.

The first two-year Stage 1 of the project (which ended in 2005) was concerned with consolidation of both service providers and users. In November 2005 Terrafirma entered Stage 2, concerned with rolling-out the service across all 25 Member States of the EC. During this stage, processing equally covering all of the EU25 Member States will be conducted along with the processing of seven landslide products within Greece, Italy and Switzerland. The present work will be focused on the description of the results obtained in Stage 2 for several cities and for landslide mapping at regional scale in Calabria (Southern Italy) and landslide monitoring at local scale for the Lumnez landslide (Switzerland).